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LAND PLANNING AND CLASSIFICATION REPORT of the Public Domain Lands

in

BAD RIVER DRAINAGE

South Dakota

Region III
Billings, Montana
February, 1949

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This report was compiled as part of the program of the Department of the Interior for the development of the resources of the Missouri River Basin.

ACKNOWLEDGEMENTS

The sources of general information contained in the report were bulletins and other published reports and maps of the U. S. Weather Bureau, Bureau of Reclamation, Soil Conservation Service, Production and Marketing Administration, Bureau of the Census, U. S. Geological Survey and South Dakota State College. Informal information was obtained through interviews with local residents of the area.

The field work necessary to the detailed examination and classification of the public domain lands was completed in the fall of 1948, by Elmer D. Hunter, Range Conservationist, who, with the assistance of J. Elliott Hall, Land Economist, compiled the data and prepared this report. William C. Anderson, Engineering Draftsman, supervised the drafting work. The study in all its aspects was under the direction of R. D. Nielson, Land Economist in Charge of Missouri Basin Studies, Region III, Bureau of Land Management, Billings, Montana.

PURPOSE AND SCOPE

This report presents a physical and economic analysis of the public domain lands within the Bad River area and has been compiled as a phase of the Bureau of Land Management's program under the integrated and coordinated departmental program for the comprehensive development of the land and water resources of the area. Detailed examination and classification of each separate tract of public domain land has been accomplished. These basic data will be used in determining the proper management and disposition program to be pursued with respect to the remaining unappropriated, unreserved public domain lands in this area.

SUMMARY

The Bad River area includes all of the drainage area of the Bad River extending from its headwaters near the town of Wall, South Dakota, eastward to a point about six miles southwest of Pierre, the State capitol. This area contains approximately 2,016,000 acres.

There are 8,770 acres of public domain land within the entire Bad River area. Detailed land examination and classification indicates all of these lands with the exception of 40 acres are suitable for grazing only and have a rather low carrying capacity for such use. These public domain lands in the area have been classified into four categories, namely: (1) lands presently withdrawn for soil classification because of selenium or "alkali" in the soil in toxic quantities; (2) lands within the exterior boundaries of South Dakota Land Utilization Project No. 2; (3) lands offering recreational and wildlife conservation possibilities; and (4) lands having insignificant value in connection with any Federal or State programs and being primarily suitable for use in connection with adjacent, privately owned land.

Those lands presently withdrawn for soil classification because of selenium in the soil in toxic quantities will be retained in Federal ownership so long as the classification withdrawal remains in effect. However, there are indications that this problem is no longer of serious consequence. In an effort to determine the need for the withdrawal, a separate investigation and report is being made. If it is determined that the withdrawal is no longer necessary, the lands should be restored to public domain status and sold at public sale. There are 3,424 acres of public lands in this category.

There are 283 acres of public land within the exterior boundaries of South Dakota Land Utilization Project No. 2. These lands should be retained in Federal ownership and administered in connection with other public land in this project. A comprehensive study of all public lands in this project is necessary to determine appropriate policy for the future of this Land Utilization project.

A 40 acre tract of marsh land appears to be primarily valuable for wildlife conservation by the State of South Dakota. They should be given the opportunity of acquiring this tract. If the land is not needed it should be disposed of at public sale.

There are 5,068 acres of public land in the area that are not needed in connection with any public land program and can be more judiciously used and managed in private ownership. It appears to be in the public interest to dispose of these lands at public sale.

The Bureau of Reclamation plans to construct a reservoir with 15,000 acre feet capacity on the North Fork of the Bad River near the town of Phillip to provide irrigation water for about 4,300 acres of land adjacent to the river. There are no public lands within the proposed irrigable area. The development will have little or no affect upon the public lands in the general area.

PHYSICAL FEATURES

Location and Size

The Bad River area is located in the west-central portion of South Dakota. It includes all of the drainage area of the Bad River extending from its headwaters near the town of Wall, South Dakota eastward to a point about six miles southwest of Pierre, the State capitol. The remainder of the Bad River drainage area has been included in the study of the South Dakota Pumping unit. The area is approximately 90 miles in length and 35 miles in width, containing approximately 3,150 square miles or 2,016,000 acres.

This area has been delineated for study on the basis of the proposed developments of the Bureau of Reclamation along the Bad River and their relationship to the public domain lands.

Topography and Physiography

The Bad River area lies entirely within what geographers have classified as the Pierre Hills section of the Missouri Plateau. The lands consist of smooth, rounded hills broken frequently by the badly eroding and deeply cutting Bad River and its tributaries. The Bad River, one of the smaller tributaries of the Missouri River has eroded its channel to a depth of from 200 to 300 feet below the upland of the region. As a result rough "breaks" adjoin the river throughout its entire length. These steeply sloping, badly eroding bluffs are characterized by great masses of bare and exposed shale formations. The land becomes rolling in character some distance from the breaks. In the western portion of the Bad River area small buttes, fantastic peaks become increasingly apparent which are characteristic of the badlands formation. The elevation ranges from 1,420 feet above sea level at the mouth of the Bad River to 2,400 feet in the extreme western portion of the area.

Climate

The Bad River area is subject to a wide range of temperatures, characteristic of continental climates. The average January temperatures for the stations within the area range from 16 to 19 degrees above zero and the average daily temperatures for July range from 75 to 77 degrees. The maximum temperature recorded in the area is 116 degrees and the minimum is 44 degrees below zero.

The average precipitation for the area is about 17 inches, with about one-third of it coming during the months of May and June. The growing season ranges from 140 to 160 days which is ordinarily adequate for the crops grown in the area. Wind velocities average from 8 to 11 miles per hour, although there are short periods of considerably higher velocity. Prevailing wind direction during a large part of the spring and summer is from the south-southeast and from the north-northwest during the remainder of the year.

Vegetation

The two predominating grasses within the Bad River area are blue grama and western wheat grass. Ordinarily they occur with other species common to the area, however, pure stands of these grasses are occasionally found in scattered sites varying from about one to one-hundred acres in size. Other grasses which are found in the area are needle and thread, Indian rice, June and plains blue grasses. Considerable little bluestem grass and scattered big bluestem are also found. Invader grasses such as cheat grass, which is prevalent throughout the area and numerous weeds and forbs are usually found on areas of unstable or disturbed soils. Several varities of sagebrush, Yucca, and prickly pear cactus are found and dwarf wild rose is prevalent throughout most of the area.

Tree growth is largely limited to the banks of the Bad River and some of its larger tributaries. Cottonwood predominates and in some of the area it is the only variety found. The cottonwood is not in sufficient quantity to be of commercial value. The public lands in the area support no timber.

Soils

About 90 percent of the soils in the Bad River area are light colored clay, clay loam and silty clay loam types. These soils are extremely sticky when wet and hard and tough when dry, necessitating special handling for the successful production of crops. The soil bakes and cracks after rains and it must be cultivated immediately for satisfactory results. Wheat, oats and corn and native hay are the principal crops. The other soils of the area, lying in the southwest portion, are dark brown, sandy loams to silt loams. The soils contain more organic matter than the clay loams and are more productive. Small grains, potatoes and hay are the principal crops. It was not intended that a soil classification be made of the area, however, more detailed information of the soils on the public lands is contained in the separate reports covering every individual parcel of public land on file in the Regional Office of the Bureau of Land Management.

ECONOMIC AND SOCIAL FACTORS

Population

The Bad River area is very sparsely populated, the estimated population is 6,000 and no town or village in the area has a population in excess of 1,000. Approximately 60 percent of the population is rural farm and the remaining 40 percent is rural non-farm (communities of less than 1,000). The population movement out of the area which took place during the drouth and depression years of the thirties and defense employment during the last decade, appears to have leveled off.

Area Economy

The Bad River area is primarily a range area and livestock production is paramount. The livestock consist almost exclusively of cattle. Some crops chiefly wheat and hay are grown in the western portion of the area where the topography and soil is somewhat better and the rainfall is slightly higher.

A small acreage in the area is devoted to corn production but with only mediocre success. According to the 1940 census the value of the livestock and livestock products sold was $841,081.00 and the value of the crops sold was $145,761.00. Except for a few small private irrigation developments along the Bad River, the farming operations are by dry farming.

The Bureau of Reclamation's future plans call for the construction of a 15,000 acre-foot reservoir on the North Fork of the Bad River near the town of Phillip. It has been estimated that only 4,300 acres are arable and suited to irrigation farming. These arable lands lie adjacent to the river throughout its entire length, below the proposed reservoir site. There are no public domain lands within the area proposed for irrigation and accordingly, this development program will have little or no direct effect upon the public lands within the area.

Public Facilities

The railroad facilities in the Bad River area are good in comparison to its character and population. Along its southern edge, there is a secondary main line of the Chicago, St. Paul, Milwaukee and Pacific Railroad; a secondary line of the Chicago and Northwestern Railroad follows the Bad River through the entire area. U. S. Highway No. 14 parallels the Northwestern Railroad and U. S. Highway No. 16 generally parallels the Milwaukee Railroad. Several improved state and county roads compliment these two highways through most of the area. Public and social facilities are scattered in view of the small and isolated population.

Land Ownership and Management Programs

Roughly 90 percent of the lands within the Bad River area are privately owned. The remaining area is owned by various Federal and State agencies. The public domain lands comprise 8,690 acres within the area of which 7,451 acres are located in Stanley County. The remainder lies in scattered tracts throughout the remaining portion of the area.

The South Dakota Land Utilization Project No. 1, administered by the Soil Conservation Service, embraces about 100,000 acres within the area. These lands were repurchased by the Federal Government under the provisions of the Bankhead-Jones Act. There were 5,776 acres of public domain land within the exterior boundaries of the land utilization project that were withdrawn for administration under the Land Utilization Program. Portions of three townships in the extreme southeast corner of the Bad River area are embraced in South Dakota Land Utilization Project No. 2, containing 27,000 acres of repurchased land. There are 240 acres of public lands within the boundaries of the land utilization project that were not withdrawn for use in connection with the project. One of the primary reasons for the establishment of this project was to study the problem of livestock poisoning on areas of selenium bearing soil.

Soil Conservation Districts have been organized covering all of Jackson and Pennington Counties and approximately the northern half of Haakon County.

Approximately 13,500 acres of the Badlands National Monument, under the supervision of the National Park Service, are within the Bad River area.

Public Land Classification and Recommendations

Detailed examination and classification was made of all public domain lands within the Bad River area. This study was concerned primarily with the following objectives: to determine the character of the land and its resource; to determine the highest use to which the lands can feasibly be placed, considering the relationship of the public lands to the overall development in the area; and, to devise a program for the proper disposition or management of the public lands. Detailed land classification reports, including appraisals, of each individual tract of public land in the area are on file in the Regional Office, Bureau of Land Management.

On the basis of the objectives enumerated above the public lands within the Bad River area have been classified into the following four categories: (1) lands presently withdrawn for soil classification because of selenium or "alkali" in the soil in toxic quantities; (2) lands within the exterior boundaries of Land Utilization Project No. 2; (3) lands offering recreational and wildlife conservation possibilities; and (4) lands having insignificant value in connection with any federal or state program and being primarily suitable for use in connection with adjacent privately owned land. A discussion of each category follows:

Public lands presently withdrawn for soil classification because of selenium or "alkali" in the soil in toxic quantities:

In the early thirties, stockmen in south-central South Dakota continuously experienced heavy livestock losses. It was ascertained that the cause of this was due to the presence of the selenium in the soil in rather heavy concentrations. This trouble had been known for many years previously and was usually termed "alkali disease". However, the extreme drought conditions existing during this period and severe over-grazing of the range aggravated the trouble and caused considerable alarm.

Selenium poisoning seems to be closely associated with the soils of the Pierre series and is assimilated by livestock through the consumption of grasses, grains and vegetables which are grown upon the affected soil. In an attempt to control the livestock poisoning the public lands in south-central South Dakota were withdrawn from settlement, location, sale, entry and all forms of appropriation. There are 3,924 acres of public land within the Bad River area which were included in this withdrawal order (see Table I). There are some indications that this selenium problem is of little consequence at the present time and that the continuation of the withdrawal is no longer justified. A separate and more detailed study of this problem has been completed and a report is being prepared to determine whether there is need for continuance of the withdrawal order. The public lands involved should be retained in public ownership pending this final determination. If and when the withdrawal order is revoked the public lands should be disposed of at public sale as they would contribute to no public programs or problems.

TABLE I

Public Lands presently withdrawn for Soil Classification because of selenium or "alkali" in the soil in toxic quantities

County	Township	Range	Section	Legal Description 1/	Acreage	Capability & Condition Classification 2/
Stanley	3 N.	28 E.	4	Lot 4, SW¼NW¼	80.17	VII-Good
			18	E½SE¼	80.00	VII-Good
			19	NE¼NE¼	40.00	VII-Good
			20	NW¼NW¼	40.00	VII-Good
	3 N.	29 E.	1	S½NE¼, SE¼NW¼ NE¼SW¼	160.00	VII-Fair
			4	Lot 3, SE¼NW¼	79.75	VII-Poor
			6	Lots 4 and 5	66.50	VII-Poor
			10	N½NE¼,S½SW¼	160.00	VII-Fair
			11	S½SW¼	80.00	VII-Fair
			13	SW¼NW¼	40.00	VII-Fair
			18	N½SE¼	80.00	VII-Fair
			20	N½N½, SE¼SW¼, SW¼SE¼	240.00	VII-Fair
			21	NE¼NE¼	40.00	VII-Fair
			22	SE¼SE¼	40.00	VII-Fair
			23	NW¼NW¼	40.00	VII-Fair
			28	N½SE¼, S½NW¼, NW¼SW¼	200.00	VII-Fair
			29	NE¼, N½SE¼	240.00	VII-Fair
			32	S½NW¼	80.00	VII-Fair
	3 N.	30 E.	4	Lot 1	40.23	VII-Fair
			7	E½SE¼	80.00	VII-Fair
			8	S½NW¼	80.00	VII-Fair
			25	SE¼SE¼	40.00	VII-Fair
			26	E½SW¼	80.00	VII-Fair
			28	W½NE¼	80.00	VII-Fair
	4 N.	30 E.	1	SW¼NW¼	40.00	VII-Fair
			5	NW¼	50.22	VII-Fair
			9	NW¼	160.00	VII-Fair
			19	SE¼SE¼	40.00	VII-Fair
			20	W½SW¼	80.00	VII-Fair
			21	NE¼NE¼	40.00	VII-Fair
			25	SE¼	160.00	VII-Fair
			27	SW¼. S½SE¼. NE¼SE¼	280.00	VII-Fair
			30	N½, N½SW¼	386.70	VII-Fair

1/ Black Hills Meridian

2/ Definitions of land capability & condition classes included in the appendix.

Public Domain Lands within the exterior boundaries of South Dakota Land Utilization Project No. 2.

There are 238 acres of public land within South Dakota Land Utilization Project No. 2 administered by the Soil Conservation Service. For some reason this public domain land was not withdrawn for supervision as was the case of other public domain within the project boundaries. The acquired lands in the land utilization project entirely surround the public domain lands. These public domain lands should be retained in public ownership and administered in conjunction with other lands in the Land Utilization Project.

TABLE II

Public Domain Lands within the exterior boundaries of Land Utilization Project No. 2

County	Township	Range	Section	Legal Description 1/	Acreage	Capability & Condition Classification 3/
Stanley 2/	3 N.	31 E.	3	Lots 1,2,3 & 4	7.54	VII-Good
			4	NW¼SW¼	40.00	VII-Good
			8	NE¼	160.00	VII-Good
			10	Lots 1,2,3 & 4	7.00	VII-Good
			15	Lots 1,2,3 & 4	6.92	VII-Good
			22	Lots 1,2,3 & 4	7.08	VII-Good
			27	Lot 1	10.23	VII-Good
				Total	238.77	

1/ Black Hills Meridian
2/ Also included in area covered by selenium withdrawal order.
3/ Definitions of land capability & condition classes included in the appendix.

Public Lands offering recreational and wildlife conservation possibilities

The NE¼SW¼ Section 21, Township 2 N., Range 16 E., Black Hills Meridian is the only public land in the Bad River area considered to be suited for recreation or wildlife conservation. This 40-acre tract is now marshland but was at one time covered with water. This public land and adjoining privately owned lands were at one time utilized as waterfowl breeding grounds and hunting. However, recent drainage and the construction of stockwatering reservoirs by adjoining owners have practically drained all of the water from the land. There is some indication that the state would be interested in acquiring this tract for a public shooting area. The South Dakota Department of Fish, Game and Parks should be advised of the findings in order that they may acquire this land. If the land is not desired, it should be disposed of at public sale.

Public domain lands contributing to no public problems or programs and what are considered primarily suited for use in connection with adjacent, privately owned lands.

There are 4,988 acres of public land within the Bad River area that have bee classified as primarily suited for grazing use in connection with adjacent privately owned lands. These lands are not needed in connection with any Federal or State existing or proposed land management program within the area. The lands lie in small and scattered parcels, which precludes effective control or management of their very limited watershed and wildlife values. Accordingly, the lands can be more effectively used and managed in private ownership without detriment to the public interest and should be disposed of at public sale (See Table III).

Public Domain lands within the exterior boundaries of South Dakota Land Utilization Project No. 2.

There are 238 acres of public land within South Dakota Land Utilization Project No. 2 administered by the Soil Conservation Service. For some reason this public domain land was not withdrawn for administration as was the area of other public domain within the project boundaries. The surrounding lands are the land utilization project entirely surrounding the public domain lands. These public domain lands should be retained in public ownership and administered in conjunction with other lands in the Land Utilization Project.

TABLE II

Public Domain lands within the exterior boundaries of Land Utilization Project No. 2

County	Township	Range	Section	Description	Acreage	Capability & Range Classification 3/
Stanley 1/	3 N.	31 E.	3	Lots 1,2,3 & 4	7.94	VII-[illegible]
			4	NW SW	40.00	VII-[illegible]
			9	[illegible]	[illegible]	VII-[illegible]
Stanley 2/	[illegible]	[illegible]	10	Lots 1,2,3 & 4	7.91	VII-[illegible]
			15	Lots 1,2,3 & 4	[illegible]	VII-[illegible]
			22	Lots 1,2,3 & 4	[illegible]	VII-[illegible]
			27	[illegible]	[illegible]	VII-[illegible]
				Total	238.[illegible]	

1/ Black Hills Meridian
2/ Also included in area covered by Executive withdrawal [illegible].
3/ Definitions of land capability & condition classes included in the appendix.

Public Lands affecting recreational and wildlife conservation possibilities

The [illegible] Section 21, Township 2 N., Range 18 E., Black Hills Meridian is the only public land in the Bad River area considered to be suited for recreation or wildlife conservation. This 40-acre tract is not presently [illegible] but at one time covered with water. This public land and adjacent privately owned lands were at one time utilized as waterfowl breeding grounds and hunting. However, recent [illegible] and the construction of [illegible] by adjoining owners have practically drained all of the water from the lake. There is some indication that the state would be interested in acquiring this tract for a public shooting area. The South Dakota Department of Game, Fish and Parks should be advised of the findings in order that they may acquire this land. If the land is not acquired, it should be disposed of at public sale.

Public Domain lands contributing to no public problems or programs and which are suitable and presently needed for use in connection with privately owned lands.

There are 2,[illegible] acres of public land outside the Bad River area that have been classified as primarily suited for grazing use in connection with adjacent privately owned lands. These lands are not needed in connection with any Federal or State existing or proposed land management program within the area. The lands lie in small and scattered parcels, which precludes effective control or management of their very limited watershed and wildlife values. Accordingly, the lands can be more effectively used and managed in private ownership without detriment to the public interest and should be disposed of at public sale (See Table III).

TABLE III

Public Lands primarily suitable for use in connection with adjacent privately owned land

County	Township	Range	Section	Legal Description1/	Acreage	Capability & Condition Classification2/
Jones	2 N.	28 E.	10	E½NE¼	80.00	VII-Poor
			11	NW¼, S½NE¼	240.00	VII-Poor
	2 N.	29 E.	18	W½SE¼	80.00	VII-Good
Haakon	1 N.	18 E.	34	N½SE¼	80.00	VII-Fair
	1 N.	19 E.	25	S½SE¼	80.00	VII-Good
	1 N.	23 E.	30	NE¼SW¼	40.00	VII-Good
	1 N.	24 E.	3	Lot 2	39.37	VII-Fair
			4	NE¼SE¼	40.00	VII-Fair
	1 N.	25 E.	10	SW¼SE¼	40.00	VII-Fair
	5 N.	23 E.	33	SE¼NE¼	40.00	VI-Good
Pennington	1 N.	16 E.	27	SW¼NE¼	40.00	VII-Good
			28	SW¼SW¼	40.00	VII-Fair
			32	SE¼NE¼, S½S½, N½SE¼, NE¼SW¼	320.00	VII-Poor
			33	NW¼SW¼	40.00	VII-Poor
	1 N.	17 E.	11	NE¼SW¼	40.00	VI-Good
	3 N.	17 E.	21	SW¼SE¼	40.00	VII-Poor
Stanley	3 N.	27 E.	5	N½SW¼, SE¼NW¼	120.00	VII-Good
			11	S½N½	160.00	VII-Good
			13	NE¼NE¼	40.00	VII-Good
			31	SE¼SE¼	40.00	VII-Good
			32	SE¼SW¼	40.00	VII-Good
	4 N.	28 E.	1	Lot 4	54.25	VII-Fair
			2	Lot 1, SE¼NE¼	94.04	VII-Fair
			13	SW¼NE¼	40.00	VII-Fair
			19	SE¼SW¼	40.00	VII-Good
			23	N½S½, SE¼SE¼	200.00	VII-Fair
			26	NE¼NE¼, S½SW¼	120.00	VII-Fair
			27	NE¼NW¼	40.00	VII-Fair
	4 N.	29 E.	1	NE¼SE¼	40.00	VII-Fair
			7	SE¼, E½SW¼	240.00	VII-Fair
			8	W½SW¼	80.00	VII-Fair
			14	SE¼	160.00	VII-Fair
			15	NE¼	160.00	VII-Fair
			20	W½SW¼, NE¼SW¼	120.00	VII-Fair
			22	NE¼	160.00	VII-Fair
			24	SE¼	160.00	VII-Fair
			25	All	640.00	VII-Fair
			26	E½E½, SW¼NE¼, NW¼SE¼	240.00	VII-Fair
			28	W½SW¼	80.00	VII-Fair
			29	S½SE¼, NW¼NW¼	120.00	VII-Fair
			33	W½NW¼	80.00	VII-Fair
			34	N½N½	160.00	VII-Fair
			35	S½NE¼, N½SE¼	160.00	VII-Fair
	5 N.	28 E.	27	N½SW¼	80.00	VII-Fair
			30	SW¼SE¼	40.00	VII-Fair
			31	NE¼NE¼	40.00	VII-Fair
	5 N.	29 E.	1	SW¼NW¼	40.00	VI-Good
				TOTAL	5,067.66	

1/ Black Hills Meridian

2/ Definitions of land capability & condition included in the appendix

APPENDIX

Definitions of Land Capability and Condition Classifications as shown in Tables I, II and III

Classes I to IV	Agricultural land requiring varying degrees of erosion control practices.
Class V	Range land requiring practically no restrictions in use.
Class VI	Range land requiring moderate restrictions in use.
Class VII	Range lands requiring severe restrictions in use.
Class VIII	Range land that is practically valueless for grazing.

Land Condition Classes

Excellent	Characterizes land with little or no erosion of any kind and native vegetation in vigorous condition.
Good	Characterizes land with minor erosion and native vegetation showing slightly reduced vigor.
Fair	Characterizes land having accelerated erosion, particularly gullying, and native vegetation showing moderately reduced vigor.
Poor	Characterizes land with serious to critical erosion with perennial native vegetation showing greatly reduced vigor.

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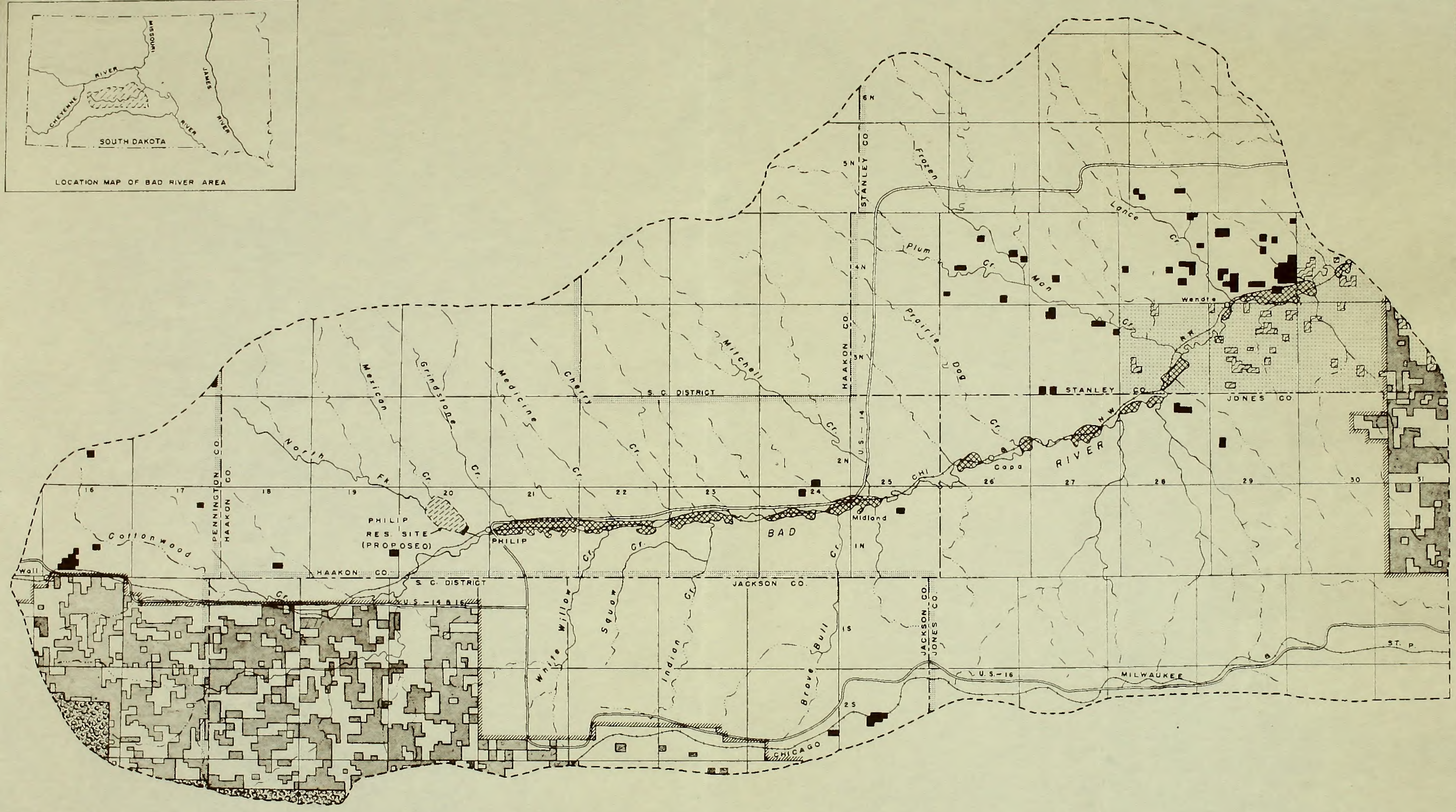

LEGEND

LAND STATUS

PUBLIC DOMAIN	■
PUBLIC DOMAIN WITHIN SELENIUM WITHDRAWAL	▨
LAND UTILIZATION PROJECTS	▩
BAD LANDS NAT'L MONUMENT	░
ARABLE LAND	▦
LAND UTILIZATION AREA	▨
SOIL CONSERVATION AREA	▤

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SCALE IN MILES

UNITED STATES
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DIVISION OF PLANNING

BAD RIVER AREA

SOUTH DAKOTA
PUBLIC DOMAIN MAP

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